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Joint Polar Satellite System (JPSS) Ground Project
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Joint Polar Satellite System (JPSS) Algorithm Specification Volume I: Software Requirement Specification (SRS) for AMSR-2 RDR

National Aeronautics and
Space Administration

Goddard Space Flight Center
Greenbelt, Maryland

Joint Polar Satellite System (JPSS) Algorithm Specification Volume I: Software Requirement Specification (SRS) for AMSR-2 RDR JPSS Review/Approval Page

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Preface

This document is under JPSS Ground Project configuration control. Once this document is approved, JPSS approved changes are handled in accordance with Class I and Class II change control requirements as described in the JPSS Configuration Management Procedures, and changes to this document shall be made by complete revision.

Any questions should be addressed to:

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Change History Log

Revision	Effective Date	Description of Changes (Reference the CCR & CCB/ERB Approve Date)
Rev-	August 22, 2013	This version incorporates 474-CCR-13-1176 which was approved by JPSS Ground ERB on the effective date shown.
-1	Oct 23, 2014	This version incorporates 474-CCR-14-2091 which was approved by the JPSS Ground ERB for CO10 on the effective date shown.
A	Oct 07, 2014	This version incorporates 474-CCR-14-1721, 474-CCR-14-1741, 474-CCR-14-1781, 474-CCR-14-1793 and 474-CCR-14-2010 which was approved by JPSS Ground ERB on the effective date shown.
B	Nov 17, 2015	This version incorporates 474-CCR-2110, 474-CCR-15-2452, 474-CCR-15-2480, 474-CCR-15-2657, and 474-CCR-15-2690 which was approved by JPSS Ground ERB on the effective date shown

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List of TBx Items

TBx	Type	ID	Text	Action
None				

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1 Introduction

The Joint Polar Satellite System (JPSS) is the National Oceanic and Atmospheric Administration's (NOAA) next-generation operational Earth observation program that acquires and distributes global environmental data primarily from multiple polar-orbiting satellites. The program plays a critical role in NOAA's mission to understand and predict changes in weather, climate, oceans and coasts, and the space environment, which support the Nation's economy and protect lives and property. The first JPSS satellite mission, the Suomi National Polar-orbiting Partnership (S-NPP) satellite, successfully launched in October 2011. S-NPP, along with the legacy NOAA Polar Operational Environmental Satellites (POES), provides continuous environmental observations. Two JPSS satellites will follow S-NPP: JPSS-1, planned for launch in fiscal year (FY) 2017, with JPSS-2 to follow in FY2022.

In addition to the JPSS Program's own satellites operating in the 1330 (±10) Local Time of the Ascending Node (LTAN) orbit, NOAA also leverages mission partner assets for complete global coverage. These partner assets include the Department of Defense (DoD) Defense Meteorological Satellite Program (DMSP) operational weather satellites (in the 1730 - 1930 LTAN orbit), the European Organisation for the Exploitation of Meteorological Satellites (EUMETSAT) Meteorological Operational (Metop) satellites (in the 2130 LTAN orbit) and the Japanese Aerospace Exploration Agency (JAXA) Global Change Observation Mission-Water (GCOM-W) satellite (in the 1330 LTAN orbit). JPSS routes Metop data from McMurdo Station, Antarctica to the EUMETSAT facility in Darmstadt, Germany and EUMETSAT, in turn, provides Metop data to NOAA. For GCOM, JPSS routes the GCOM-W data from Svalbard, Norway through the NOAA Satellite Operations Facility (NSOF) in Suitland, MD, processes GCOM-W data and delivers GCOM-W products to the JPSS users who have JAXA permissions.

Additionally, the JPSS Program provides data acquisition and routing support to the DMSP and the WindSat Coriolis Program. JPSS routes DMSP data from McMurdo Station to the 557th Weather Wing at Offutt Air Force Base in Omaha, NE. After processing, the 557th releases the DMSP data for public consumption over the Internet via the National Geophysical Data Center in Boulder, CO. The JPSS Program provides data routing support to the National Science Foundation (NSF), as well as the National Aeronautics and Space Administration (NASA) Space Communications and Navigation (SCaN)-supported missions, which include the Earth Observing System (EOS). As part of the agreements for the use of McMurdo Station, JPSS provides communications/network services for the NSF between McMurdo Station, Antarctica and Centennial, Colorado.

As a multi-mission ground infrastructure, the JPSS Ground System supports the heterogeneous constellation of the before-mentioned polar-orbiting satellites both within and outside the JPSS Program through a comprehensive set of services as listed in Table 1-1.

Table: 1-1 JPSS Ground System Services

Service	Description
Enterprise Management and Ground Operations	Provides mission management, mission operations, ground operations, contingency management and system sustainment
Flight Operations	Provides launch support and early orbit operations, telemetry and commanding, orbital operations, mission data playback, payload support, flight software upgrade, flight vehicle simulation, and disposal at the end of mission life
Data Acquisition	Provides space/ground communications for acquiring mission data
Data Routing	Provides routing of telemetry, mission and/or operations data through JPSS' global data network
Data Product Generation	Provides the processing of mission data to generate and distribute raw, sensor, environmental, and ancillary data products
Data Product Calibration and Validation	Provides calibration and validation of the data products
Field Terminal Support	Provides development and operational support to the Field Terminal customers

1.1 Identification

This volume documents the software used in the generation of Raw Data Record (RDR) algorithms for the Advanced Microwave Scanning Radiometer-2 (AMSR-2). It also documents the AMSR-2 RDRs.

1.2 Algorithm Overview

The AMSR-2 instrument is flown on the Global Change Observation Mission (GCOM) satellites operated by the Japanese Aerospace Exploration Agency (JAXA). It will not fly on any JPSS satellite but is part of the JPSS mission through an MOU between JAXA and NOAA. The GCOM space segment is operated by JAXA, but the JPSS Ground System, retrieves the data from AMSR-2 instrument on GCOM satellites and relays it to NOAA/NESDIS for processing. The JPSS ground processing software produces RDRs for AMSR-2 instrument from the application packets received.

1.3 Document Overview

Section	Description
Section 1	Introduction - Provides a brief overview of the JPSS Ground System and the relevant algorithm, as reference material only.
Section 2	Related Documentation - Lists related documents and identifies them as Parent, Applicable, or Information Documents such as, MOAs, MOUs, technical implementation agreements, as well as Data Format specifications. This section also establishes an order of precedence in the event of conflict between two or more documents.
Section 3	Algorithm Requirements - Provides a summary of the science requirements for the products covered by this volume.
Appendix A	Requirements Attributes - Provides the mapping of requirements to verification methodology and attributes.

2 Related Documentation

The latest JPSS documents can be obtained from URL: https://jpssmis.gsfc.nasa.gov/frontmenu_dsp.cfm. JPSS Project documents have a document number starting with 470, 472 or 474 indicating the governing Configuration Control Board (CCB) (Program, Flight, or Ground) that has the control authority of the document.

2.1 Parent Documents

The following reference document(s) is (are) the Parent Document(s) from which this document has been derived. Any modification to a Parent Document will be reviewed to identify the impact upon this document. In the event of a conflict between a Parent Document and the content of this document, the JPSS Program Configuration Change Board has the final authority for conflict resolution.

Doc. No.	Document Title
470-00067	Joint Polar Satellite System (JPSS) Ground System Requirements Document (GSRD)
470-00067-02	Joint Polar Satellite System (JPSS) Ground System Requirements Document (GSRD), Volume 2 - Science Product Specification
474-00448-01-01	Joint Polar Satellite System (JPSS) Algorithm Specification Volume I: Software Requirements Specification (SRS) for the Common Algorithms

2.2 Applicable Documents

The following document(s) is (are) the Applicable Document(s) from which this document has been derived. Any modification to an Applicable Document will be reviewed to identify the impact upon this document. In the event of conflict between an Applicable Document and the content of this document, the JPSS Program Configuration Change Board has the final authority for conflict resolution.

Doc. No.	Document Title
474-00448-02-30	Joint Polar Satellite System (JPSS) Algorithm Specification Volume II: Data Dictionary for the AMSR-2 RDR
474-00448-04-30	Joint Polar Satellite System (JPSS) Algorithm Specification Volume IV: Software Requirements Specification Parameter File (SRSPF) for the AMSR-2 RDR

2.3 Information Documents

The following documents are referenced herein and amplify or clarify the information presented in this document. These documents are not binding on the content of this document.

Doc. No.	Document Title
474-00333	Joint Polar Satellite System (JPSS) Ground System (GS) Architecture Description Document (ADD)
474-00054	Joint Polar Satellite System (JPSS) Ground System (GS) Concept of Operations (ConOps)
470-00041	Joint Polar Satellite System (JPSS) Program Lexicon
429-05-02-42	Joint Polar Satellite System (JPSS) Mission Data Format Control Book for NPP
472-00251	Joint Polar Satellite System (JPSS) Mission Data Format Control Book for JPSS-1

3 Algorithm Requirements

3.1 States and Modes

Not applicable.

3.1.1 Normal Mode Performance

Not applicable.

3.1.2 Graceful Degradation Mode Performance

Not applicable.

3.2 Algorithm Functional Requirements

Not applicable.

3.2.1 Product Production Requirements

Not applicable.

3.2.2 Algorithm Science Requirements

Not applicable.

3.2.3 Algorithm Exception Handling

Not applicable.

3.3 External Interfaces

3.3.1 Inputs

Not applicable.

3.3.2 Outputs

SRS.01.30_144 The AMSR2 RDR software shall generate the AMSR2 Mission Data RDR from mission data packet APID specified in the JPSS Algorithm Specification Vol IV: SRSPF for AMSR2 RDR (474-00448-04-30) <RDR><Mission>.

Rationale: The AMSR Mission Data (Science) RDR is generated from the specified mission data packet APIDs

Mission Effectivity: GCOM-W1

SRS.01.30_145 The AMSR2 RDR software shall generate the AMSR2 PCD Supplemental Data RDR from mission data packet APIDs specified in the JPSS Algorithm Specification Vol IV: SRSPF for AMSR2 RDR (474-00448-04-30) <RDR><PCDSupplemental>.

Rationale: The AMSR PCD Supplemental (Housekeeping Telemetry) RDR is generated from the specified mission data packet APIDs.

Mission Effectivity: GCOM-W1

SRS.01.30_169 The AMSR2 RDR software shall generate the AMSR2 GPSR Data RDR from mission data packet APIDs specified in the JPSS Algorithm Specification Vol IV: SRSPF for AMSR2 RDR (474-00448-04-30) <RDR><GPSR>.

Rationale: The AMSR GPSR (Geolocation Data) RDR is generated from the specified mission data packet APIDs.

Mission Effectivity: GCOM-W1

3.4 Science Standards

Not applicable.

3.5 Metadata Output

Not applicable.

3.6 Quality Flag Content Requirements

Not applicable.

3.7 Data Quality Notification Requirements

Not applicable.

3.8 Adaptation

Not applicable.

3.9 Provenance Requirements

Not applicable.

3.10 Computer Software Requirements

Not applicable.

3.11 Software Quality Characteristics

Not applicable.

3.12 Design and Implementation Constraints

Not applicable.

3.13 Personnel Related Requirements

Not applicable.

3.14 Training Requirements

Not applicable.

3.15 Logistics Related requirements

Not applicable.

3.16 Other Requirements

Not applicable.

3.17 Packaging Requirements

Not applicable.

3.18 Precedence and Criticality

Not applicable.

Appendix A. Requirements Attributes

The Requirements Attributes Table lists each requirement with CM-controlled attributes including requirement type, mission effectivity, requirement allocation(s), block start and end, method(s) for verifying each requirement, etc.

Req ID	Requirement Text	Level 3 Type	Product Type	Mission Effectivity	Allocated To	Block Start	Block End	Block 2.0.0 VM	Block 2.1.0 VM
SRS.01.30_144	The AMSR2 RDR software shall generate the AMSR2 Mission Data RDR from mission data packet APID specified in the JPSS Algorithm Specification Vol IV: SRSPF for AMSR2 RDR (474-00448-04-30) <RDR><Mission>.	F	RDR	GCOM-W1	CGS	2.0.0	3.0.0	Inspection	NA
SRS.01.30_145	The AMSR2 RDR software shall generate the AMSR2 PCD Supplemental Data RDR from mission data packet APIDs specified in the JPSS Algorithm Specification Vol IV: SRSPF for AMSR2 RDR (474-00448-04-30) <RDR><PCDSupplemental>.	F	RDR	GCOM-W1	CGS	2.0.0	3.0.0	Inspection	NA
SRS.01.30_169	The AMSR2 RDR software shall generate the AMSR2 GPSR Data RDR from mission data packet APIDs specified in the JPSS Algorithm Specification Vol IV: SRSPF for AMSR2 RDR (474-00448-04-30) <RDR><GPSR>.	F	RDR	GCOM-W1	CGS	2.0.0	3.0.0	Inspection	NA